R E P O R T

of

S A N I T A R Y S U R V E Y

of

E L S A L V A D O R

March 7 - 12, 1941.

by

V. H. CORNELL, LT. COL., M. C., U. S. ARMY.

OUTLINE FOR SANITARY SURVEY OF PROPOSED MILITARY AREAS.

I. INTRODUCTION.
   a. Location of country; district involved and areas actually surveyed.
   b. Other sources of information.
   c. Reason for survey with type mission concerned.

II. HISTORY.
   (Brief outline).

III. TOPOGRAPHY AND GEOLOGY.
   Top and sub-soil. Drainage; swamps; streams; floods, etc. (with special reference as to effects on health, economics, accessibility, etc.)

IV. CLIMATE.
   Temperature, rainfall, seasons; effect on health and conditions in general.

V. POPULATION.
   Number; composition by races; educational social, health and economic status; cultural development.
   Urban; rural; manufacturing; agricultural. Recreation; types, availability.

VI. GOVERNMENT.
   Form. Outline. Departments and other divisions. Place of Health Dept.

VII. PUBLIC WORKS.
   a. Water. Sources; amount; treatment; quality; reserve; additional supply available; military vulnerability. General; and for cities and large towns.
   b. Sewage Disposal. Type. Efficiency. Dangers. Expansion. New developments in process, proposed or advisable.
   c. Garbage and Rubbish Disposal. As under (b).
   d. Manure disposal. As under (b).
   e. Insect Control. Flies. Mosquitoes. Ants. Termites. Ticks, lice and bedbugs. Others.
   f. Transportation. (Rail; roads; air.)
   g. Electric Power. (Type; distribution; reserve; expansion; availability).
   h. Gas (As under g).)
   i. Communications. (Mail; phone; telegraph; radio.)

VIII. MEDICAL FACILITIES.
   a. Health Dept. Organizational outline (verbal or graphic). Personnel. Reports. Efficiency. Reliability. Cooperation. Laboratory. Prophylactic measures in use. Extent of control of health Activities. Deficiencies.
   b. Medical Practitioners. Number. Training. Relation to Health Dept. Others. Licensure.

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d. Manure disposal. As under (b).
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f. Transportation. (Rail; roads; air.)
g. Electric Power. (Type; distribution; reserve capacity; availability).
h. Gas (as under g.)
i. Communications. (Rail; phone; telegraph; radio.)

VIII. MEDICAL FACILITIES.
a. Health Dept. Organizational outline (moral or remedy). Personnel. Reports. Efficiency. Reliability. Cooperation. Laboratory. Prophylactic measures in use. Extent of control of health activities. Deficiencies.
b. Medical Practitioners; number. Training. Relation to Health Dept. Others. Literature.

c. Hospitalization. Nominal and geographic list with capacity, both present and expanded. Extent of occupancy; adequacy for civil and military use. Efficiency of administration. Sanitary aspects. Other means for emergency hospitalization; buildings; schools, convents, etc.
d. Medical Supplies. Source. Adequacy. Quality. Control. Excess. Emergency source. Deficiencies.

IX. GENERAL HEALTH CONDITIONS.
a. General:-climate; racial types; habits; economic status; health practices and control.
b. Venereal Disease. (Syphilis; gonorrhea; chancroid; lymphogranuloma). Incidence; control; districts; clinics; case finding and following.
c. Respiratory Group. Incidence by diseases: Influenza; Pneumonia; Diphtheria; Measles; Mumps; Meningitis; Poliomyelitis. Control: methods; efficiency; defects. Tuberculosis: Extent; control; trend; type.
d. Intestinal Diseases: Typhoid-paratyphoid group. Dysentery; bacillary and amebic. Common Diarrhea. Sprue. Cholera. Trichinosis. Bot infestations.
e. Insect Borne Diseases. Yellow Fever. Malaria. Dengue. Pappatacci. Typhus. Rocky Mt. Spotted. Filariasis and Elephantiasis. Relapsing Fever. Plague. (Rat control.)
f. Other Communicable Diseases. Smallpox (elastrim?) Chicken pox. Leprosy. Yaws. Schistosomiasis. Tropical Ulcer. Trachoma. Anthrax. Rabies. Tetanus.
g. Other Diseases. Rheumatic Fever. Bartonellosis. Snake and insect bites. Nutritional Conditions (Beri-beri; Pellagra, etc.) Tropical Ulcer and allied skin conditions.
h. Quarantine Methods. Maritime and general. Laws; enforcement; efficacy; defects.

X. HOUSING.
General: Types, rural and urban.
Available for use:-permanent; temporary; emergency.
Suitability of available public and private building.
Tents; barracks; new construction or reconstruction.
Type advisable. Locality. Utilities available or absent.

XI. CLOTHING.
Used by natives. By resident Nordics.
Advisable re climate and seasons.

XII. FOOD.
a. Meat: availability; types; source; condition; storage.
b. Milk: dairies; control; number; adequacy of supply; treatment; epidemics.
c. Vegetables: types; safety; availability.
d. Fruits: types; safety; availability.

e. Flour: source; abundance; period of safe storage.
f. Beverages: coffee; tea; soft drinks; others. Source; availability; dangers.
g. Cold Storage and Ice Plants.
h. Markets.

XIII. SUMMARY.

REPORT OF SANITARY SURVEY OF EL SALVADOR*

March 7 to 12, 1941.

by

Lt. Col. V. H. Cornell, M. C., U. S. Army.

I. INTRODUCTION.

El Salvador, the smallest of the Central American States is located approximately between the parallels of 13° and 14°24' N. latitude and the meridians of 87°39' and 90°08' W. longitude. It is bounded on the south by the Pacific Ocean, on the north by Honduras, on the west by Guatemala and on the east by Honduras and the Gulf of Fonseca. Thus it is the only one of these Central American states which does not have a port on the Caribbean Sea. However, there is a railroad to the Caribbean through Guatemala. The Central American isthmus at this point is about 200 miles wide, and this country about 75 miles wide at its broadest portion; its length is approximately 170 miles. It has approximately 10,000 square miles in area. At the east end it borders upon the Gulf of Fonseca which is also surrounded on the other sides by portions of Honduras and Nicaragua. It is on the deeper side of that Gulf and hence has the only port to which fairly large ships can directly enter and tie up.

This position, its roads, the distribution of population, the railroad terminals and the rail exit from the country make the coastal strip, varying from 40 to 50 miles in width, the important section of the country from a military viewpoint. The capital, the three ports of

*(The original data is filed in the Office of The Surgeon General, United States Army, Division of Preventive Medicine. See list at the end of this report.)

Acajutla, La Libertad and La Union with their connecting roads and railroads and the larger cities along them, together with the airfields are of prime interest in this zone.

Consequently, this survey deals chiefly with that area; the Capital, the road net to the west and east boundaries, two of the ports and the larger cities and towns along these routes being visited. One port, Acajutla, chiefly of importance for exports of coffee, is connected only by railroad. It is in a very unhealthy spot and due to poor connections and the fact that the customs and all other activities of the port are conducted at Sonsonate, the actual port was not visited. This is the third in importance, the first being La Union where imports and exports in 1938 were 32.5% of the total and the second La Libertad with 27.9%; even the national statistics list the other port as Sonsonate which had 20% of the total. The rest entered or left the country by rail, road and air, at other points.

Information obtained from other sources is chiefly from the statistical data collected with comments thereon by Dr. Sutter, Director General of Public Health, whose comments and information on many other details were relied upon for accurate information. Dr. H. W. Kumm of the Rockefeller Foundation is temporarily residing here and much valuable information and opinion was also obtained from him.

The survey of this country was begun without much knowledge as to its possible importance in a medico - military sense, as very little could be obtained from any source before entry. However, the survey has convinced the writer that there are some features which make it most important. The railroad from Puerto Barrios in Guatemala to La Union in

Salvador is an excellent means of communication between the Caribbean and Pacific with a branch line to Acajutla. The hard surfaced road from the Guatemalan border runs thru the capital, San Salvador, to near San Miguel and will probably be complete to the latter place within the year. The road from there to La Union is very bad but is only about 25 miles long and could probably be greatly improved in a short time. There is a good hard surface road from San Salvador to the port of La Libertad. The development of the larger cities is such that there are buildings available for military use and at Santa Ana there is a large 700-1000 bed hospital nearly completed except for equipment, this being on the road and railroad which extends across the country and connected by them to all three ports. It is not near a military objective other than these means of transportation and not close to them. It is also connected by road to Guatemala City and to that city and the Guatemalan port of Puerto Barrios by rail.

II. HISTORY.

Like that of the other Central American countries, El Salvador is bound with them in early history (see Honduras report) and dates its independence from September 15, 1821. Like them too, it has passed through years of quarrels with the neighboring states, frequent and almost continual bickering between political, or rather, personal groups within the country and exploitation by the group in power, one after the other. There are listed about 99 governing officials for the country from 1830 to date, with varying periods of government for each, and with many duplications of the same name as men became President for a term then were removed for some reason or by one means or another. The present incumbent has been in office, except for a short period, since December 4, 1931.

His term does not expire under the new constitution until January 1, 1945. It is generally admitted by natives and resident Americans alike, that the present is the best administration they have had. The new constitution was adopted January 21, 1939, and is deemed appropriate for this nation.

III. TOPOGRAPHY AND GEOLOGY.

Photographs of maps prepared by Dr. Sutter on field surveys to show the relation of malaria to density of population and altitude are filed which are considered much more accurate than the other colored large map which was purchased locally. This rather clearly outlines the chief topographic features of the country, namely, a shallow coastal strip along the west end of the country extending a slightly further distance inland near Sonsonate; a much broader or deeper zone of such lowlands in the eastern end of the country reaching through the entire country to its northern border along the river channels and even into the interior of the more eastern portion which would usually be thought of as highlands because it is beyond mountains or higher areas, and not apparent on most maps at first glance. Much of the rest of the country is in the area marked as between 300 to 900 meters (1,000 to 3,000 feet). These latter areas with the relatively small sections of higher elevation contain most of the population. There are many hills and low mountains throughout the 300-900 meter areas with rather deep gullies and much surface erosion but the soil is rich volcanic and there are many farms, extensive coffee plantations on the higher portions and considerable sugar and sisal cultivation. Some beans and sugar are exported to other Central American countries. The higher altitudes are rather limited to the peaks and sides of the numerous volcanic peaks, a few of which are still slightly active. One of these,

Volcan San Salvador, erupted in 1917 causing some damage in the city of that name and leaving a broad bed of lava which is crossed by the railroad en route to Sonsonate; there is another large bed in another portion of the country but this is very old and the date of its deposit not known. Of interest in this respect is the record (see Anuario Estadistico for 1938) of seismologic disturbances in 1938 which records a total of 193 quakes in that year, 43 of which were "sensible"; 85 were local and 105 diffuse. As stated much of the topsoil is volcanic in origin and in the hillsides where cuts have been made for roads layers of volcanic ash can be seen intermittent with layers of sand, gravel, larger stones of smooth round surfaces and some layers of clay. Some of this clay is quite light in color, other layers are more yellow. Apparently there was an old ocean bed with either layers of ash and lava laid down on the bed of the ocean or alternate rising and falling of the earth with periods of volcanic activity and later submersion and further deposit of silt, sand or gravel. The Navy (U. S.) has made extensive surveys of the Gulf of Fonseca and details of that region about La Union should be available in their files. About Acajutla and the Lempa river region the low lands are heavily infested by mosquitoes and the scarcity of population and industry would not justify any effort to eradicate them. The southern part of the Department of Usulutan, east of the Lempa River, is like these last-named areas in this respect. The Lempa River is the largest in the country and beginning in the western portion about 15-20 miles from the western border, flows southwest almost half way to the Pacific, then turns east to the Honduran border near the middle of the country then south and finally southeast to the sea. The Rio Goascoran is at the Honduran border on the east, the

Rio San Miguel in the eastern province by that name, and several smaller rivers also flow to the Pacific. There are four fair sized lakes, Llopango near San Salvador in the center of the country, de Guija at the northwest edge bordering Guatemala, the Laguna de Coatepeque in Santa Ana Department and L. de Olomega in San Miguel near the eastern end.

IV. CLIMATE.

The climate on the coast and in the lowlands is tropical and in the higher regions semi-tropical with quite cool nights; as one goes to the higher elevations the nights are very cool and the days pleasant. Records of temperature for 1937 and 1938, together with those for humidity, barometric pressure, evaporation winds, rainfall, are given on pages 7 and 9 of the Statistical report for 1938, and the rainfall records at several places in the article by Dr. Sutter; "Primer Informe" on pages 281-284. Further such data are given in the "Anales del Observatorio Nacional Meteorologico de San Salvador" and "Boletin Estadistico" for the year 1939 which are filed. For a period of 28 years the normal mean was 23.1C, the maximum 32.8C and the minimum 16.3C. The dry season is generally December to April with some extension into the months at either end or shortening in a similar manner. The annual rainfall varies little over the country and averages 1835.5 mm. (73.4 inches) per year, with a range from 1566 to 2283 mm. (39.2-57.1 inches) over a 28 year period, with an average of 121 days of rain. Very good tables of these two features, temperature and rainfall, are given on pages of the "Anales" with other data.

The effect of these features on health is as elsewhere in such countries, namely great increase in malaria in the rainy season with some increase in respiratory diseases also at this time; in the dry season

water becomes scarce in some areas and less safe, the plains become very dry and the roads extremely dusty. Food is less plentiful at the end of the dry season where irrigation is not, or cannot be practiced.

V. POPULATION.

The last census was taken in 1930 and recorded as 1,459,578 for the country; previous figures were adjusted to this and the following years computed from it. The present estimation of population (latest available) as of December 31, 1939, was 1,744,535. These were classified as 655,127 urban and 1,089,408 as rural, but observation of "urban" areas leads one to agree with Dr. Sutter that the rural should be at least 10% higher as they consider every capital of a Department as urban without regard to the conditions, and this might well apply to some other towns. The map prepared by Dr. Sutter shows the distribution of the population very well, each dot representing a thousand persons. It will be seen by reference to this that the population in general is on the higher areas and that aside from a few large cities the population is not greatly crowded in spite of the relative density of about 50 per square mile. The urban area of San Salvador has about one tenth of the population and nearly an eighth is in that Department.

By races there is less variation here than in the other Republics visited; they are of Spanish, mestizo or Indian blood with a very small admixture with other races. The city of San Salvador shows within itself extremes of culture and education seen throughout the country. It is a modern city in a great many respects but the market and other conditions about the outskirts illustrate the Indian manners and customs but little changed. The social and health conditions reflect the lower

educational level of the general population though the higher intellectual groups have their own manners and customs strongly influenced by the Spanish background of the country. Economically this country is far better off than many others, though at present in a slump due to loss of European coffee markets. But in normal times the country has developed in a way which, in spite of the difficult political vacillations, is a definite indication of the industriousness of the people. Yet there is a very definite social status as between the more moneyed, higher educated, intellectual group and the peon class. Away from the cities, except for the few large plantation houses, the homes are of primitive type. There is but little manufacturing and none for export. One example indicates their industriousness - they now (in the last 6-7 years) raise their own hennequin (a type of sisal leaf) and make their own coffee bags instead of importing bags from India. The statistical publications referred to under IV give the distribution of the population by districts.

In 1937 there were listed 1039 Government primary schools, 105 municipal and 97 private. Secondary schools were numbered 44 of which 6 were normal schools, 18 arts and letters and 20 commercial. Registration for that year was 89,839. A total of 446 were registered at the Universities where courses in Jurisprudence, Medicine, Pharmacy, Dentistry and Engineering are conducted.

VI. GOVERNMENT.

This country is a constitutional republic with a new constitution adopted in 1939. There are the usual three branches, executive, legislative and judicial. The President is elected for a period of six years. The National Legislature is composed of three representatives from

each department whose term is one year. The Supreme Court, four lesser courts and the Justices at the chief municipalities exercise the law. The cabinet is composed of Ministers of Government; Agriculture; Public Health, Public Works; Credit, Industry and Commerce; Foreign Relations; Justice; Public Instruction; and National Defense. Agriculture and Public Health are now under one Minister; also Foreign Relations and Justice are combined.

VII. PUBLIC WORKS.

(a) Water. Water is generally quite plentiful throughout the country and many springs and wells are used as sources for their water supplies. Electricity is generally obtained from water power. The following table gives the data collected regarding the water supply of the larger towns; those marked with an asterisk (*) were visited; those marked with a number sign (#) have over 10,000 population; the others are between 5,000 and 10,000; some other data is also entered here for convenience. ("O.O." means an order and "C. & D." means collected and dumped.)

NAME	WATER SOURCE	TREAT-MENT	CONDI-TION	SEWAGE PVT.	SEWAGE SYST.	GARBAGE
Santa Ana*#	Sprs.	Chl.	Safe	Some	80%	Incin.
Chalchuapa #	Sprs.	No	Safe	Some	85%	Dump(Inc.O.O.)
Ahuachupan #	Sprs.	No	Safe	Many	10%	C. & D.
Atiquizaya	Sprs.	No	Unsafe	All	None	None
Sonsonate*#	Sprs.	No	Safe	50%	50%	C. & D.
				(40% Cesspool; 10% Privies)		
Nahuizalco	Sprs.	No	Unsafe	All	None	None
Izalco	Sprs.	No	Unsafe	All	None	None
Armenia #	Sprs.	No	Unsafe	All	None	None
Juayua	Sprs.	No	Unsafe	All	None	None
Santa Tecla*#	Sprs.	No	Safe	All(10% Cesspool)		C. & D.(Inc.O.O.)
Quezaltepeque*	Sprs.	No	Unsafe	All	None	None
Opico*	Sprs.	No	Unsafe	All	None	None
San Salvador*#	Spr. and Well	Chl.	Safe	Some	80%	C. & D. (Inc. at D.)
				(Few Sept. Tks. & Cesspools.)		

NAME	WATER SOURCE	TREAT-MENT	CONDI-TION	SEWAGE PVT.	SEWAGE SYST.	GARBAGE
Majicanos	Sprs.	No	Unsafe	All	None	None
Villa Delgado	Sprs.	No	Unsafe	All	None	None
Chalatenago	Sprs.	No	Unsafe	All	None	None
Acajutla(Port)	River	No	Unsafe	All	None	None
LaLibertad # (Port)	River	No	Unsafe	Some	80%	None
LaUnion #(Port)	Sprs.	No	Safe	All	None	C. & D.
Cojutepeque*#	Sprs. (QNS)	No	Unsafe	All	None	None
Suchitoto*	Sprs.	No	Unsafe	All	None	C. & D.
Zacatecoluca*	Sprs.	No	Unsafe	65%	35%	C. & D. (Poor)
San Juan Nonualco						
San Vicente*	Sprs.	No	Unsafe	85%	15%	C. & D.
Seusuntepeque	Sprs.	No	Unsafe	All	None	None
San Miguel*#	Spr. (Chl. on order)	No	?	90%	10%	C. & D.
Chinameca #	Sprs.	No	Unsafe	All	None	C. & D.
Usulatan	Sprs.	No	Unsafe	90% (Improving)	10%	Poor
Jiquilisco	Spr.(QNS) Wells(Shallow)		Unsafe	All	None	None
Jucuapa#	Sprs.	No	Unsafe	All	None	C. & D.
Santiago de Maria	Spr. (QNS)	No	Unsafe	All	None	C. & D.

In general it is observed that the water supplies are unsafe. This is due to the density of the population, the poor control of many of the water sheds, the minimal amount of sewage systems and the endemic typhoid and amebic dysentery. In San Salvador, though the supply is marked safe, all the better class boil their water and the hotels place bottles of water in the rooms for drinking, presumably boiled though mine smelled so strongly of chlorine it is safe to assume it had never been near a fire! It is probably safest to be suspicious of all supplies. Sewage disposal is fair in the larger cities but on their outskirts there is no extension of the system and in many there are cesspools and privy vaults with a

minimum of septic tanks. The privies are of a very elemental type. Most of the Indians prefer to squat and do so even on toilets when supplied, climbing up on them to assume their natural position. In some of the hospitals the toilets have a soapstone back wall, a trench along the rear and a stone floor with slightly raised foot steps thus affording a place for the favorite posture without complicated plumbing; a stream of water washes down the wall and trench. It was stated that San Salvador hoped to secure some deep wells nearer town for their supply of water. Sewage disposal units in course of construction or contemplated have been indicated.

(b) Sewage. (See above).

(c) Garbage and Rubbish Disposal. (See above). This is good in the cities and fair in the towns. Again the dogs and vultures assist.

(d) Manure Disposal. Only so far as combined with rubbish. There is no apparent effort to conserve this material as fertilizer.

(e) Insect Control. Efforts at fly control are nil other than the removals mentioned above. They are plentiful in some areas and a real menace about the food markets and hospitals. Screening is not used effectively except by Nordics resident here. Even where installed at some hospitals they have been permitted to deteriorate, or removed for air.

Mosquito control is in its infancy. There has been no general survey of the types and breeding places though Dr. Sutter has made an intensive study of the incidence of malaria by spleen surveys and checked by blood smears. Dr. Kumm of the Rockefeller Foundation is now in this country for a survey of mosquitoes and has under way a demonstration control project at San Miguel where they are manufacturing concrete drains

and sidings. Both the Curry type of invert and one-third sections of large round pipe forms are being used with wall slabs. Maps (photos) are filed showing the general topography of the country, the distribution of the population, the results of the splenic index study and the department municipalities. These will be published shortly in the Journal of Tropical Medicine and reprints will be secured. In Dr. Sutter's "Primer Informe" on this subject he classes the areas studied as to the degree of endemicity (page 293).

Ants and termites are active here as in other countries of this area and in construction of wood this should be borne in mind but no evidence of any general method of control was noted. Ticks are abundant but there is no evidence of their bearing any human disease. The lice and bedbugs of the lower class are present but not seen in the better classes.

(f) Transportation. The International Railways of Central America run from Cutuco and La Union at the eastern end across the flatter portion of the country south of the mountains to San Salvador, thence to Santa Ana and Metapan and then exits to Guatemala, being continued in that country to the Caribbean port of Puerto Barrios. A branch of this road goes southwest to the city of Ahuachapan. The main line actually runs from San Salvador to Texis Junction near Texistepeque, and a spur connects this junction with Santa Ana. This line has a total trackage of 314.5 miles of which 285.5 miles are first track; 36" gage, 30 and 33 feet rails of 54 and 60 pounds; ties of native hardwood (pine and redwood) totalling 768,225. The Salvador Railway Co., of English ownership, has 100 miles of first track and a total of 113.5 miles, 36" gage; rails 25 and 30 feet, weights 54.5 and 60 pounds; approximately 300,000 ties of native hardwood,

principally balsam. This railroad runs from San Salvador to Sonsonate and Acajutla and another line from San Salvador to Santa Ana with a connecting short line between Alcos and Silto del Nino.

The road from the Guatemalan border west of Santa Ana to San Salvador and east to San Miguel is well paved and hard surfaced, with the exception of a few stretches to the east which are expected to be completed this year. This highway will branch northeast near San Miguel to enter Honduras east of Santa Rosa. The road from San Miguel to La Union is in very bad shape with holes and at this time of the year from 8 to 10 inches of dust. The road from Sonsonate to Santa Ana is poor but passable and was travelled by car. The road from San Salvador to Sonsonate is not good and was avoided. The road from Sonsonate to Acajutla is said to be even worse than that to La Union and no one cared to drive it even now in the dry season. The road from San Salvador to La Libertad is hard surfaced and good. Other roads are poor. The Pan American Airway makes one stop at the capital where the airport is good; data on other airports will be secured from Captain June in Guatemala. The Taca line is still operating here but what the results of the purchase of this line by American Exports will eventually be cannot be said.

(g) Electric power. A list of the power plants with their capacity and type current is being filed. They generally are of water power and yield a 110 volt, A.C., 60 cycle, 3 phase current. In general it may be said that electrification of the cities is good though at La Union the current is turned off in the day time as they use Diesel power; a kerosene refrigerator was in use in one shop visited. A list of cities supplied is also filed.

(h) Gas. None available.

(i) Communications. Mail is distributed by the trains, air, and from the points they reach by carts or muleback. The local service appears fairly good; air service is good. A list of telephone and telegraph stations is being filed. The telephone service is fair and it is difficult to hear at distances. The list of amateur stations as complete as available is given in the general radio list. Government and PAA radio communication and the Western Union are used. Mail to other countries leaves by the three ports here and Puerto Barrios, Guatemala. Cable connections via La Libertad.

VIII. MEDICAL FACILITIES.

(a) Health Department. The Health Department is administered by the Director General of Sanitation under the Minister of Assistencia Social. It is administered under three divisions, Laboratory, Preventable Diseases, and Engineering. Statistics and Hospitals are not under this Department. There are four laboratories, including the one at the central office in San Salvador; the other three merely do such diagnostic work as is needed without determinative bacteriology or other extensive service. The central laboratory does most of the water analyses, prepares vaccines, does chemical analyses and general bacteriology. The Preventable Disease Division has five subdivisions, Malaria, Tuberculosis, Venereal Disease, Maternal and Child Health and Rural Districts. Malarial control has been mentioned and is under control of the central office. There are two tuberculosis control centers, one in San Salvador and one in Santa Tecla; fluoroscopy is used primarily at San Salvador and a unit is to be installed at Santa Tecla. There are four Venereal Disease control clinics in the

country where prostitutes are controlled more or less and other cases treated; prostitutes with open syphilitic lesions or gonorrhea are hospitalized. The M.C.H. has Prenatal, Infant (well and sick), Pre-school and School Clinics. This is not too well established as yet but is functioning in the larger cities and a real effort is being made to increase the work. In connection with the school clinics there are dental clinics. There are 4 prenatal, 4 infant, 1 pre-school and 14 school clinics, the latter being in the Department Capitals. There is one Sanitary Engineer in the central department and five field workers are used who vary in the locale of their work as needed.

This organization is but about a year old having been revamped by Dr. Sutter, a graduate from Johns Hopkins School of Public Health. He has an excellent grasp of the needs of the country, is enthusiastic and honestly interested in the development of the service. His staff consists of the following: Chief Child Hygiene, and M.D., C.P.H. (Harvard), full time; Tuberculosis Division, M.D., part time; Chief Venereal Disease Division, M.D., part time; Chief Laboratory Division, M.D., part time; Chief Engineering Division, Engineer, part time; General Secretary, M.D., part time; also five physicians on part time and five engineers on full time. There is a part time doctor in charge of the public health activities in the capital of every Department of the country and at each port including Ilopango airport (San Salvador). There is a Sanitary Inspector in each municipality of over 5,000 population and in six other important places of less than 5,000.

There are three Sanitary Units established, one in San Miguel, one in Santa Ana and one in Santa Tecla. At each there is a physician as

director on full time; in addition there are two assistant part time doctors at Santa Tecla. The rest of the staff at Santa Tecla consists of one Secretary, three Sanitary Inspectors, three Visiting Nurses, one Clinic Nurse and one Dentist. At each of the other two there are five Sanitary Inspectors, two Visiting Nurses (at San Miguel and four at Santa Ana), one Clinic Nurse and one Secretary.

The Sanitary Unit at Santa Tecla is being run as a Demonstration Unit and much effort being placed there; the results as gaged by the reaction of the community are very favorable; they have arranged rental of a larger and better building and seem to like the idea. The houses in this community have been surveyed as to residents, sewage and water connections and these all mapped.

There is much work to be done in this line throughout the country and progress can be seen but it will take a long while to educate the people of all classes as to the necessity and wisdom of the work. Proper methods to commence this are being used and the centers of population are first being approached with the idea of giving the greatest good to the most people. The present government seems to be well behind the idea.

(b) Medical Practitioners. A list of Medical Practitioners is filed with those who have studied outside the country indicated thereon by Dr. Sutter. These total about 30% of the whole. The Medical School was visited and, though small, was found quite complete. Their greatest need is more competent direction and a steadier, more interested staff of instructors. About ten to fifteen are graduated each year. The only restriction on practitioners from other countries is that they pass the examination. Osteopaths, chiropractors, etc. are not licensed. There are

247 physicians listed, of whom 115 are in San Salvador, but this Department has only about 12% of the population. Many of those who have been abroad have not studied too well but on the other hand there are many good men here. Some have lost considerable interest in the School and Hospital because of poor management of those institutions and here is a real need for improvement.

(c) Hospitalization. In the August number (1940) of the Bulletin of the Pan American Sanitary Bulletin there appears an article reviewing the conditions existant in the hospitals of this country, which survey was made, at the request of the President, by Dr. Oswald D. Denney, of the Pan American Sanitary Office. A map shows the general concentration of population with respect to available hospital beds and the main hospitals are spotted thereon. The article gives the numerous deficiencies and recommendations for improvement of the service. His recommendation that a Director be appointed has been followed but the results have not been what were desired; most of the defects still exist. The large hospital at San Salvador is not in keeping with the progress of the city otherwise. The Bloom Hospital for Children, a philanthropic enterprise directed by the donor, Mr. Bloom, is a surprising contrast to the old hospitals, for it is a modern, clean, excellently equipped and managed hospital. The hospital at San Miguel was the best seen on this trip and is of the old style but cleaner, has been brought up to date and in many respects is entirely satisfactory though there are still some defects and some of the improvements have been allowed to deteriorate. There is a large 700 to 1000 bed hospital practically completed at Santa Ana which is of steel beam construction with concrete walls, tile floors, and porches, heavy

corrugated iron roof, high ceilings with ventilation beneath the overhanging eaves, and all buildings needed for facilities. This hospital has been about ten years in construction and could be completed in a very short time. It is next to the old 500 bed hospital of that city which is in very poor condition. However, if needed, this new hospital could be utilized by military forces to great advantage. It is located in a city which is on the railroad, on the hard surfaced road through the country and connected by these to three ports in Salvador and one in Guatemala. Railroad connection with Guatemala City, San Salvador, Puerto Barrios, Guatemala, Acajutla, and La Union; hard surfaced road connection with San Salvador, and the port of La Libertad with hard surfaced road to within 25 miles of La Union (this could be extended without too great difficulty, at least to be practical.)

A list of Hospitals, Orphan Asylums, and other institutions is given below and some additional data regarding available buildings is filed which was secured for the writer by Dr. Sutter from the Department of Hospitals. (The number sign (#) means visited.)

CITY	HOSPITAL	BEDS	CONDITION
Santa Ana	# General	500	Fair
	# New	700-1000	New, unused
	# Orphan Asylum	200?	Fair
	Old Folks Home	?	Fair
Chalchuapa	Municipal	10	Bad
Ahuachupan	General	60	Fair
	Orphan Asylum	200	Fair
Sonsonate	# General	300	Fair
	# Orphan Asylum	200	Fair
Santa Tecla	# General	100	Fair
	# Orphan Asylum	?	Fair
San Salvador	# General	1000	Good
	# Childrens	135	Excellent
	Venereal Dis.(Fem.)	60	Poor
	# Orphan Asylum	400 (700 Children)	Good
	Military Hospital		

CITY	HOSPITAL	BEDS	CONDITION
Chalatenango	General	20	Bad
La Union	# General	20	Bad
Cojutepeque	General	25	Bad
Suchitoto	General	30	Poor
Zacatecoluca	General	30	Bad
San Vicente	General	120	Fair
San Miguel	# General	200	Good
	Orphan Asylum	?	?
Usulutan	General	54	Poor
Jucuapa	General	100	Fair
Santiago de Maria	General	50	Bad

(See also list of Hospitals in Prontuerio Geografico in file.)

In general it may be said that these hospitals are filled to capacity and are not available for military use, nor for that matter in general desirable. The one exception is the large new one at Santa Ana. In the cities of over 10,000 population (See VII) there are generally buildings which might be made available and these have been indicated on the list mentioned above which is filed.

(d) Medical Supplies. As regards medical supplies, all are imported, and the same remarks as to their adequacy and prices as are given under the country of Honduras might apply. However, the drugstores are of good type, appear well stocked and there should be no immediate shortage of necessary items for small groups.

IX. GENERAL HEALTH CONDITIONS.

(a) General. The predominant Indian race in this country govern to a great extent the economic and health conditions of the country and their habits, ingrained for centuries, are broken with difficulty. This makes it difficult to introduce new ideas or methods and education of the peon class is low. In the cities there are the Spanish families with higher planes of life who readily acquiesce to new ideas though some

are necessarily modified to meet their living conditions and type of homes. Yet, except for San Salvador, many of the homes are dark, poorly kept and rather heart-breaking for a public health man to contemplate. One is struck that all these cities base their life about the family, the homes being constructed, even in the better class, on the "hollow square" type with the central patio where flowers and grass may be found but presenting a blank wall to the outsider on the sidewalk with no street improvement and the only green spots to be seen in the few parks or plazas. And in the poorer homes these central patios are not so well kept but serve for laundry, animals and children alike. As sewer connections are few or absent in many places, the privy, cesspool and water wells may be clustered here also, though the well is usually outside this area. The climate along the low lands as described above is very favorable for the breeding of mosquitoes aided by the tropical rains and these areas are extremely unhealthy; this also applies to the low lands along the river basins in the interior. The greater part of the population is on the somewhat higher region where there is less malaria, and the climate is more pleasant. The abundant water supply is inadequately cared for to yield a good source of drinking water and is a regrettable but unavoidable situation to be reckoned with by anyone entering the country.

(b) Venereal Diseases. Venereal disease is a problem; the prostitutes are in houses to some extent but not by any means entirely so. They are controlled to some degree but this is so only in the larger cities and the venereal diseases are a menace to any entering force. The exact incidence is difficult to estimate and is probably about 10% to 15% for syphilis and unknown for gonorrhea. There is some granuloma. The

clinics and case management have been discussed.

(c) Respiratory Group. There have been no severe epidemics of influenza but pneumonia is frequent due to the poor housing and the heavy rains with added hazard due to late reporting to the physicians and long distances to hospitals. Diphtheria is endemic but rarely epidemic and is controlled by spot use of toxoid and serum. Measles is ever present and small epidemics occur nearly yearly; only in the better class of private patients is any effort at control made and the placental extract is used to a slight degree. Mumps is moderate in incidence and rather mild; meningitis rare and poliomyelitis very rare.

Tuberculosis is a big problem and there is a large building of about 100 beds a short distance outside the city of San Salvador and a ward of the general hospital in the city for care of such cases; the management of these has been in the hospital division but this tuberculosis work is to be turned over to the Health Department in the near future under a director of that Division. Definitive work in this line is being placed on a better plane and it is felt will soon be much more effective. The true incidence of this disease is buried to a great extent in the inaccurate diagnoses, wrong classification and lack of attendance.

(d) Intestinal Diseases. Of the intestinal diseases amebic dysentery is quite prevalent but probably less so than generally supposed. Typhoid has occured in small epidemics and is endemic throughout the country. Paratyphoid is likewise encountered but not in large numbers. One epidemic of 50 cases of so-called typhoid last year, on investigation, showed many cases sick only about 10 days. Hence the amount of this disease is also hidden by incorrect diagnoses and inadequate laboratory

checking. Bacillary dysentery is not reported. The other transmissable intestinal diseases are not troublesome or recognized. There is high infant mortality and much infantile diarrhea.

(e) Insect Borne Diseases. Malaria is the great scourge of this country as of the other Central American countries. The spleen and blood film surveys of Dr. Sutter in the "Primer Informe" give some indication as to the prevalence and distribution of the disease. Work on the mosquitoes of the country is to be done by Dr. Kumm as mentioned above. In many of the areas concerned, as about the port of La Union, it is the opinion of authorities here that the condition can be easily controlled by drainage and oiling; but about Acajutla it is impracticable. About the larger cities it would be economically sound and feasible. Yellow fever has not appeared since 1923 but the Aedes egyptii are still present (3 - 5% of homes where search was made). Dengue not recognized; endemic typhus is present, there being only a few cases in San Salvador and Santa Ana. Other insect borne diseases not found.

(f) Other Communicable Diseases. Smallpox occurs occasionally but all school children are vaccinated and all contacts when a case appears; routine vaccination is used at varying periods of all people and about 50,000 are done each year; there have been no cases in the last three years. Chickenpox is fairly common. Leprosy is rare and there is no colony. Yaws is seen occasionally. There is some filariasis and a small amount of elephantiasis. There is a small amount of trachoma in the natives of Palestine and India but not in the natives of El Salvador. Anthrax occurs but not often; the serum is used. Rabies is rare. Tetanus is frequent but the majority of cases are umbilical in new born and efforts

to enforce the use of sterile cord dressings are in progress.

(g) Other Diseases. There is little rheumatic fever; snake bites are rare but occur; nutritional conditions in infants are numerous but the presence of sprue, pellagra and beri-beri are not recognized. Tropical ulcer of the leishmania type does not occur; other sores are frequent but of undetermined etiology.

(h) Quarantine Methods. House quarantine in the contagious diseases is poor; ship and port quarantine are formalities only and dependence is placed on reports from Panama and San Francisco; more attention is paid to ships from other ports.

X. HOUSING.

The city houses as mentioned above are generally of the Spanish type, cool and comfortable and when well kept, ideal for this climate but in the poorer classes often are dirty, closed and poorly ventilated. These houses frequently have no real patio but what amounts to a laundry and small farm in the rear. In the cities these homes have a common sitting and bedroom in front and a kitchen, etc., in one or two small, poorly ventilated rooms to the rear. In the towns with no pavement or only poorly kept cobblestone streets there is much dirt and dust, the animals and children, chickens, dogs, pigs and often birds mingle in the yard and houses alike. This is not the true picture everywhere but the poorer and dangerous class from the health standpoint. There are in every city and town, homes of similar form but kept neat and clean - these we do not need to worry about.

The native homes are built of log frames with bamboo or board sidings and thatched roofs in general though there are also many with

tiles of home manufacture. Many other houses are made of adobe bricks with straw between them and bamboo sticks. There are many of the adobe walled houses in the towns and cities too, and in San Salvador brick and reinforced concrete is used in the more modern buildings.

For military use temporary wooden structures could be utilized as in Panama.

XI. CLOTHING.

In weight it is generally tropical; in quality it varies with the economic situation; the children of tender years do not worry about it. Clothing as used in Panama would be suitable and such has been worn continually by the writer in comfort while here in the dry season. Sun helmet is advisable in the middle of the day. The few higher regions are cooler.

XII. FOOD.

Meat is plentiful and good, but sold and consumed the same day. Honduras and Guatemala have additional reserve. Chickens and pork as well as beef are quite plentiful. There are no storage facilities for any quantity. (See page 22 of Beletin Estadistico.)

There are no large dairies and the milk supply is limited. None is pasteurized and a case of Brucellosis has recently been bacteriologically confirmed.

Vegetables are fairly abundant and good though all raw vegetables should be well cleansed before eating. The personal habits of vendors and cooks are not to be trusted. The same remarks apply to the fruits. Both fruits and vegetables are more of the tropical variety and are good.

Flour is imported though home ground corn tortillas are consumed

in large quantities - they are quite good but here the handling enters again and they should be well cooked and eaten fresh. Storage periods should be limited.

The local beer, coca-cola, orange bottled drinks and such are good. The stronger drinks are imported. Coffee is plentiful and good; tea is imported.

Ice is manufactured at the following places; where known the capacity of the plants is given: San Salvador, 3 plants, (La Constancia Brewery, 5 tons; E.S.S.E. power plant, 7½ tons; C.A.E. power plant, 10 tons); San Miguel, 5 tons; San Vicente, 2 tons; Zacatecoluca, 2 tons; Cojutepeque, 500 pounds; Suchitoto, 300 pounds; La Union; Ahuachapan; Santa Ana; Sonsonate; Usulutan.

The markets are poorly policed, crowded by dry goods in the stalls about the sides and the vegetables and fruits sold from baskets on low boxes in the middle of wide aisles; the meats are piled on open unprotected counters or hung over racks above. The sanitary precautions (?) are almost nil. Food, both raw and cooked, is sold from tables about the market place.

REPORT OF SANITARY SURVEY OF EL SALVADOR

Original Data Filed in the Preventive Medicine Division,

Office of The Surgeon General, U. S. Army.

1. Airport Photos.
2. Blueprint - Map of City of San Salvador.
3. List of Hospitals and Buildings Available for Additional Beds. (All of Buildings Specified not acceptable or truly available. List received too late to check all details.)
4. Nominal list of Physicians by Localities.
5. List of Ice Plants in El Salvador.
6. General Information Sheet - American Legation.
7. Colored Map of El Salvador.
8. Electric Power Plants - El Salvador. Also Cities Serviced.
9. Outline Maps of El Salvador (M.I.D., G.S. No. 112-B.)
10. Report of Meteorological Observatory, San Salvador - 1939.
11. Boletin Estadistico - January, 1940 - Data of 1939.
12. Graphic Bulletin of Statistics.
13. Prontuario Geografico - General Data re El Salvador - 1939.
14. Anuario Estadistico for 1938.
15. Primer Informe (Malariologia). Dr. Sutter (1938).
16. Boletin de la Oficina Sanitaria Panamericana - Ano 19:8, August, 1940. (Article on Hospitals of El Salvador.)

#727-SGO-4/10/41